*CHEM 242 – Lecture 5 15/01/2014*

Overheads: - Outline

Recap Monday: SN2 Reactions



NOTE: “2” 2 steps! SN2 = 1 step, SN1 = 2 steps



How do we know if a reaction was SN2? (not SN1)

1) Kinetics: rate = [R-Br]/t = k[R-Br][OH-]

(if double either conc., rate doubles)

🢡 Do kinetics experiments to see if rate depends onboth (2nd order) must be SN2

2) Stereochemistry:



3) Effect of Sterics:



Leaving Groups: Halides = most common (others in Ch. 11)

🢡 anything that likes to leave! (with e- pair)

🢡 X- must be stable (X = Electronegative)

What makes a good LG?

🢡 the easier it is to break C-LG bond, the better the LG (*ie* weaker bond)



General Rule: Weaker base = better LG

⮡ worse e- donor doesn’t want to give back e-

\* if base is stronger than F-, very bad LG!

e.g. OH- stronger base terrible LG



Nucleophiles:

- love H+ / + base

- must have lone pair of e- to donate

- can be anionic (H-O:-) or neutral (H2O:)



General Rule: stronger base = better Nu-

- opposite of LG 🢡 makes sense: Nu- in / LG out!

OH- > H2O 🢡 stronger base 🢡 anions generally better Nu-

CH3- > NH2- > OH- > F- acidity increases ⭢ (for HA)



basicity increases ⭠ (for A-)

F- > Cl- > Br- > I- F- stronger base



(AND I- bigger more steric hinderance)



true in aprotic solvent (no OH or NH); *e.g.* acetone or ether

BUT, in protic solvent, trend reversed

* H-bonding increases size of Nu-



Summary of Nu- trends: (periodic table)

